ABC of rheumatology
Low back pain

Cathy Speed

Low back pain affects more than 70% of the population in developed countries and poses a major socioeconomic burden, accounting for 13% of sickness absences in the United Kingdom. The annual incidence in adults is up to 45%, with those aged 35-55 years affected most often. Although 90% of episodes of acute low back pain settle within six weeks, up to 7% of patients develop chronic pain.

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Causes of low back pain

Low back pain has many causes. It may be due to disease or injury at one or more sites within the spine or it might be a feature of a systemic disease, sepsis, or malignancy. Overall, 1% of people presenting with back pain in primary care have a neoplasm, 4% have compression fractures, and 1-3% have a prolapsed disc. Pain may also be referred to the back or from it.

Causes of low back pain

Structural
- Mechanical or non-specific
- Facet joint arthritis or dysfunction
- Prolapsed intervertebral disc
- Annular tear
- Spondylolysis or spondylolisthesis
- Spinal stenosis

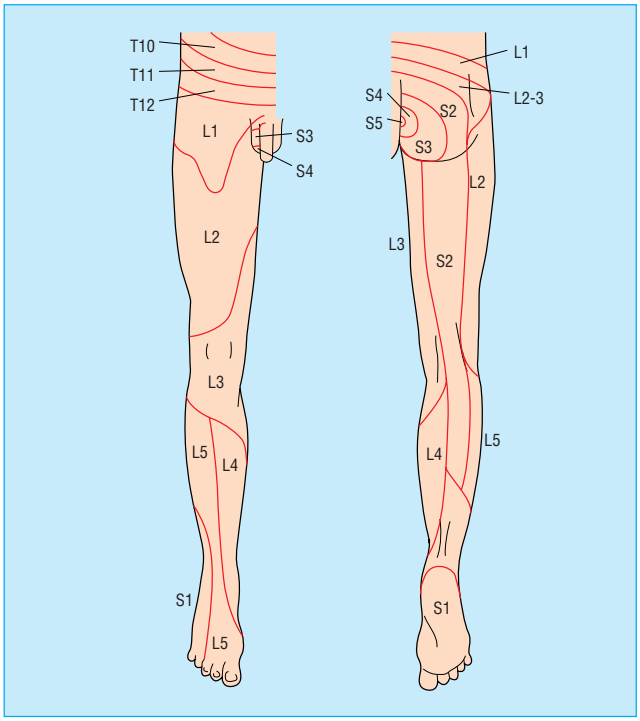
Neoplasm
- Primary or secondary

Referred pain to spine
- From major viscera, retroperitoneal structures, urogenital system, aorta, or hip

Infection
- Discitis
- Osteomyelitis
- Paraspinal abscess

Inflammatory
- Spondyloarthropathies
- Sacroiliitis or sacroiliac dysfunction

Metabolic
- Osteoporotic vertebral collapse
- Paget's disease
- Osteomalacia
- Hyperparathyroidism



Lumbosacral dermatomes

Evaluation of patients

The first aim of evaluation of patients with back pain is to identify the source of the pain and, in particular, to identify the few patients who have a serious underlying disorder. Assessment then aims to assess the degree of pain and functional limitation, define the contributing factors where possible, evaluate the patient's expectations, and develop an appropriate management strategy.

A careful history is taken, including the nature of the onset of the complaint; occupational, sporting, and general medical history; the characteristics of the pain; neurological symptoms; morning stiffness; and systemic features.

Suspicion of an underlying complaint should be particularly high when the patient is aged under 20 years or over 55 at initial onset, when pain is non-mechanical or thoracic, and when systemic symptoms, neurological signs, a structural deformity, or a history of malignancy, steroids, or HIV infection are present.

Examination should assess gait, posture, deformities, ease of range, and rhythm of movement, site of pain and tenderness, neurological signs, provoking movements, and contributing factors. Detailed examination of other systems is necessary because pain may be referred.

Features of lumbar and nerve root lesions

Nerve root	Weakness	Reflex change
L2	Hip flexion, adduction	NA
L3	Knee extension	Knee
L4	Knee extension	Knee
	Ankle dorsiflexion	
L5	Foot inversion	NA
	Great toe dorsiflexion	
	Knee flexion	
S1	Ankle plantar flexion	Ankle
	Knee flexion	

NA = not applicable.

Important questions relating to back pain: "PQRST"
- **P**rovocative and **P**alliative factors
- **Q**uality of pain
- **R**adiation
- **S**everity and **S**ystemic **S**ymptoms
- **T**iming

Imaging of lumbar spine

Radiographs of the spine are not usually necessary unless an underlying disorder, such as spondyloarthropathy, spondylolysis, infection, or malignancy, is suspected. Computed tomography shows the bony anatomy and also gives the best images of the detail of facet degeneration and spinal stenosis. Magnetic resonance imaging is used to examine soft tissue structures, such as the discs and nerve roots. Isotope bone scanning is indicated in specific situations, such as suspected sacroiliitis or malignancy.

Magnetic resonance image showing posterolateral disc prolapse

Low back with leg pain

Many spinal complaints can result in pain referred to the leg, and in some cases back pain may not be noted. The distribution of leg pain and associated signs indicates if the pain is due to a trapped nerve root (radiculopathy). True sciatica radiates below the ankle, and pain is exacerbated by stretching the nerve.

The commonest cause of true sciatica is prolapse of intervertebral discs. Intervertebral discs make up about 25% of the height of the spine. Each disc consists of an outer fibrocartilagenous annulus fibrosus, which facilitates torsional movements, and an inner nucleus pulposus. The fibres of the annulus are kept under tension by the nucleus pulposus, which is 70-90% water; this allows it to change shape in response to compressive force.

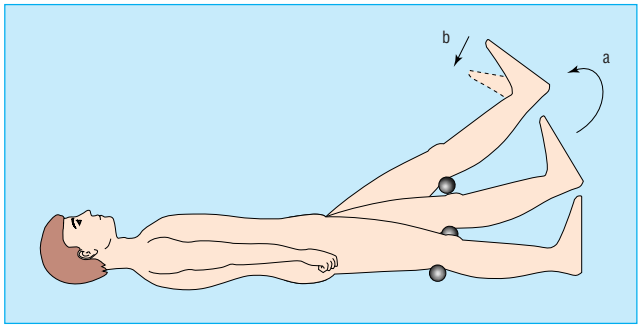
Nerve roots lie in the immediate path of laterally prolapsing intervertebral discs. In the lumbar spine, such prolapses can compress the lower emerging root to produce pain and dysaesthesiae in the associated dermatome and other features typical of a lumbar root syndrome.

Spinal stenosis—Narrowing of the spinal canal is relatively common in elderly people. It can have several causes, including facet joint arthrosis, ossification of the longitudinal ligament, Paget's disease, and ankylosing spondylitis. Symptoms typically include low back pain, leg pain, and pseudoclaudication. The spinal canal should be examined by magnetic resonance imaging or computed tomography, and surgery is indicated for severe symptoms.

Cauda equina syndrome—Compression of the cauda equina can occur with central disc herniation, epidural masses (for example, abscesses), or tumours. Low back pain, bilateral sciatica, saddle anaesthesia, loss of sphincter tone, and bladder and bowel incontinence may result. Urgent magnetic resonance imaging is needed to find the cause and direct management.

Facet arthrosis or syndrome—Pain from facet joints is common, particularly in patients with degenerative disc disease. Local or diffuse back pain may be associated with leg pain but without localising neurological signs. Treatment includes analgesia, modification of activities, and rehabilitation. Local corticosteroid injections are used occasionally.

Non-specific back pain—In 85% of cases, pain in the low back results from the presumed effects of mechanical and postural stresses on spinal and paraspinal structures ("non-specific" back pain), although the pathophysiology is poorly understood. Muscles, particularly those of the abdomen (the obliques, transversus, and recti) provide dynamic stability and fine control to the spine. This is important when deciding on the appropriate management of non-specific back pain. Pain can be worse with movement in any plane, may radiate to one or both legs, and is relieved by lying with the hips and knees flexed.



The straight leg raise test is positive if pain in the sciatic distribution is reproduced between 30° and 70° passive flexion of the straight leg. Dorsiflexion of the foot exacerbates the pain

Red flags in patients with low back pain

- Acute onset in elderly people
- Constant or progressive pain
- Nocturnal pain
- Fever, night sweats, weight loss
- Morning stiffness
- Bilateral or alternating symptoms
- Neurological disturbance
- Sphincter disturbance
- Immunosuppression
- Current or recent infection
- History of malignancy
- Claudicant symptoms, signs of peripheral ischaemia or abdominal mass
- Pain that is not improved with lying in the fetal position or prone with the stomach supported

Mechanical stresses on spine

- Twisting
- Flexion
- Extension
- Rotation
- Lifting
- Repetitive work
- Static postures, such as sitting at a desk

Management

In the absence of serious pathology, management should focus on education and encouragement about pain control so that

rehabilitation can be started. In the most acute cases, in which muscle spasm is severe, one or two doses of diazepam can be useful. When a facet joint problem is suspected, some doctors advocate facet joint injections for diagnostic and therapeutic use.

Rehabilitation is through manual and exercise therapy to mobilise and strengthen the supporting structures of the spine, correction of postural and biomechanical irregularities, and educating patients about their back. A multidisciplinary team may be required, particularly if ergonomic issues are thought to be contributing to the pain. Most patients with a prolapsed disc respond to such measures, but surgery may be necessary.

Localised back pain

Spondyloarthropathies

Spondyloarthropathies represent a group of inflammatory arthritides affecting the spine and sacroiliac joints and are associated with iritis, enthesopathies, and variable peripheral arthritis. They include ankylosing spondylitis and the reactive, psoriatic, and enteropathic arthritides. The enthesis is the primary site affected, where inflammation is followed by fibrosis and ossification. Features are back or buttock pain with morning stiffness. Management depends on the condition but includes exercise and anti-inflammatory drugs.

Spondylolysis and spondylolisthesis

A spondylolysis is a stress fracture through the pars interarticularis that can be congenital or acquired after repetitive flexion-extension-rotation movements (such as occur in bowling during cricket). The lumbosacral region is particularly vulnerable to mechanical stress because the mobile spine moves on a fixed pelvis in this region; lesions are therefore most common here. Pain is often localised, is worse with extension and rotation, and may be troublesome at night.

Spondylolisthesis ("vertebral sliding") occurs where bilateral spondylolysis permits vertebral displacement. If displacement is excessive, neurological compromise can occur.

Spondylolysis is confirmed by oblique radiographs and single photon computed tomography will show whether the lesion is active. Spondylolysis is treated with relative rest to allow the bone to heal. Bracing can help, but a few patients require surgery. Persistent pain, progression of the slip, neurological signs, or sphincter disturbance in spondylolisthesis are also indications for surgery.

Annular tears

A decline in water content with age (from 90% in young people to 65% in older people) reduces the tension in the annulus and contributes to development of tears or fissures in the annulus. As annular tears progress, the nucleus can prolapse through the tear. Acute tears of the annulus can also occur with twisting movements, particularly in flexion.

Sacroiliac joint

The sacroiliac joint is a partially synovial joint bound by many strong ligaments. Pain from the sacroiliac joint can result from inflammation, major trauma, stress fractures, or mechanical stresses. Pain can also be referred from the lumbar spine.

Sacroiliac joint pain is typically felt in the buttock, but it may also be felt in the low back or thigh. Lumbar spine extension often exacerbates symptoms, but clinical tests lack specificity. A bone scan with sacroiliac indices is indicated if sacroiliitis is suspected. Management depends on the cause. Relative rest, anti-inflammatories, or rarely a fluoroscopic guided steroid injection may be indicated for pain control.

Short term management of pain

- Simple analgesics
- Non-steroidal anti-inflammatory drugs
- Mild to moderate opiates (with laxatives if necessary)
- Transcutaneous nerve stimulation
- Tricyclic antidepressants

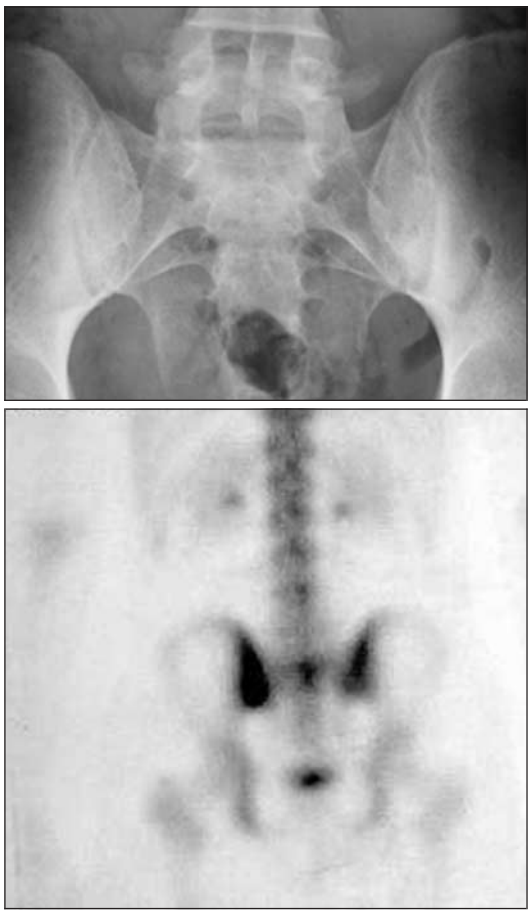
Patterns of some back disorders

Pain worse with flexion
- Disc prolapse (plus neurological signs)
- Annular tear

Pain worse with extension and rotation
- Facet joint disorder
- Spondylolysis
- Localised buttock pain
- Sacroiliac disorder

Claudicant pain eased by flexion
- Spinal stenosis

Progressive bilateral neurological deficit and sphincter disturbance
- Central disc prolapse
- Cauda equina syndrome
- Cord compression
- Spinal vascular accident



Plain radiograph and corresponding bone scan of patient with sacroiliitis

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